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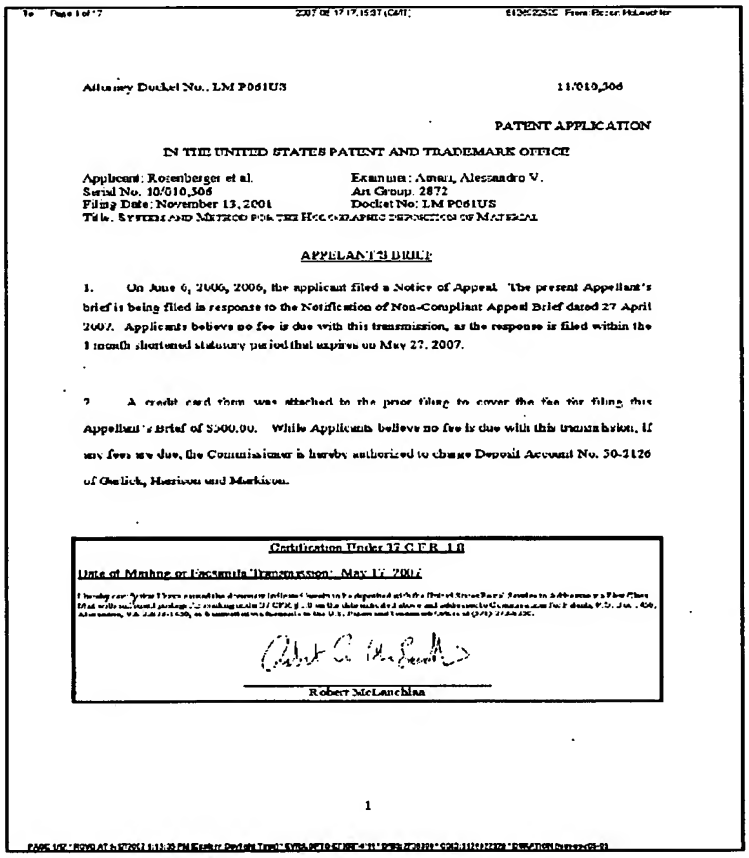

Attorney Docket No.: LM P061US 11/010,306

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Rozenberger et al. Examiner: Amari, Alessandro V.
Serial No. 10/010,306 Art Group: 2872
Filing Date: November 13, 2001 Docket No: LM P061US
Title: SYSTEM AND METHOD FOR THE HOLOGRAPHIC DESTRUCTION OF MATERIAL

APPELLANT'S BRIEF

1. On June 6, 2006, 2006, the applicant filed a Notice of Appeal. The present Appellant's brief is being filed in response to the Notification of Non-Compliant Appeal Brief dated 27 April 2007. Applicants believe no fee is due with this transmission, as the response is filed within the 1 month shortened statutory period that expires on May 27, 2007.

2. A credit card form was attached to the prior filing to cover the fee for filing this Appellant's Brief of $500.00. While Applicants believe no fee is due with this transmission, if any fees are due, the Commissioner is hereby authorized to charge Deposit Account No. 50-2126 of Gerlick, Harrison and Markison.

Certification Under 37 C.F.R. 1.8

Date of Mailing or Facsimile Transmission: May 17, 2007

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Robert McLauchlan

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Attorney Docket No.: LM P061US 11/010,506

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Rosenberger et al. Examiner: Amari, Alessandro V.
Serial No: 10/010,506 Art Group: 2872
Filing Date: November 13, 2001 Docket No: LM P061US
Title: SYSTEM AND METHOD FOR THE HOLOGRAPHIC DEPOSITION OF MATERIAL

APPELANT'S BRIEF

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Certification Under 37 C.F.R. 1.8

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I hereby certify that I have caused the document indicated herein to be deposited with the United States Postal Service to Addressee via First Class Mail with sufficient postage for mailing under 37 CFR § 1.8 on the date indicated above and addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or transmitted via facsimile to the U.S. Patent and Trademark Office at (571) 273-8300.

Robert McLauchlan

3. Real Party in Interest:

The inventors, Brian T. Rosenberger, et al. have assigned their entire rights, title and interest in and to the invention of the present patent application to the Lockheed Martin Corporation.

4. Related Appeals and Interferences:

The appellant, the Assignee, and the undersigned are not aware of any related Appeals, Interferences, or judicial proceedings that would affect or have a bearing on the Board's decision in the pending appeal.

5. Status of Claims:

The present patent application includes claims 1, 3 and 7 - 25 all of which currently stand rejected. The appellant is requesting the Board of Appeals to review the rejection of claims 1, 3 and 7 - 25.

6. Status of Amendments:

There have been no amendments filed subsequent to the close of prosecution.

7. Summary of the Claimed Subject Matter:

Claim 1 claims an apparatus for forming a three-dimensional structure from a gaseous medium. The apparatus includes a processing chamber that contains the gaseous medium, and a holographic projector to project at least one hologram into the gaseous medium within the processing chamber. The hologram imparts energy to dissociate gas precursors within the gaseous medium causing dissociated gas precursors to deposit in a pattern corresponding to the at least one hologram. Refer to Figures 1-7 and page 7, line 7, through page 18, line 33, of the present patent application for embodiments and examples of the present invention.

Claim 7 claims an apparatus operable to deposit a three-dimensional structure. The apparatus includes a holographic projector to project a series of holograms, a gaseous delivery system to deliver gas precursors; and a processing chamber. The processing chamber further includes a window transparent to the holograms, a plane on which the holograms are imaged, an inlet to receive the gas precursors from the gaseous delivery system. The hologram imparts energy to dissociate the gas precursors causing dissociated gas precursors to deposit in the plane in a pattern corresponding to the hologram. An outlet is provided to exhaust effluent from the

processing chamber. Refer to Figures 1-7 and page 7, line 7, through page 18, line 33, of the present patent application for embodiments and examples of the present invention.

Claim 9 claims a method for forming a three-dimensional solid structure. The method begins by establishing a process environment having a controllable pressure, temperature and atmospheric composition, wherein the atmospheric composition comprises gas precursors. A first hologram is imaged within the process environment. This hologram imparts energy to the gas precursors, causing the gas precursors to dissociate. The dissociated solids from the gas precursors form a first solid layer corresponding to the hologram. Subsequent holograms are imaged within the process environment, wherein the subsequent hologram imparts energy to the gas precursors, causing the gas precursors to dissociate. The dissociated solids from the gas precursors form a subsequent solid layer corresponding to the subsequent hologram, wherein the subsequent solid layer is joined to the first solid layer. Refer to Figures 1-7 and page 7, line 7, through page 18, line 33, of the present patent application for embodiments and examples of the present invention.

8. Grounds of Rejection to be Reviewed on Appeal:

A. Claims 1, 3, 10, 11 and 13-16 have been rejected under 35 U.S.C. 102(b) as being anticipated by Deutsch et al (U.S. Patent No. 4,340,617).

B. Claim 7 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Marcus (U.S. Patent No. 5,017,317).

C. Claims 9,12 and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Maxwell et al (U.S. Patent No. 5,786,023).

D. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Marcus (U.S. Patent No. 5,017,317) and further in view of Amako et al (U.S. Patent No. 5,497,254).

E. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Amako et al (U.S. Patent No. 5,497,254).

F. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Maxwell et al (U.S. Patent No. 5,786,023) and further in view of Amako et al (U.S. Patent No. 5,497,254).

9. Argument:

A. Claims 1, 3, 10, 11 and 13-16 have been rejected under 35 U.S.C. 102(b) as being anticipated by Deutsch et al (U.S. Patent No. 4,340,617).

Deutsch, et al does not teach or suggest an apparatus for forming a three-dimensional structure within a gaseous medium. Deutsch further does not teach or suggest projecting a series of holograms into a gaseous medium where the holograms impart energy to dissociate gas precursors within the gaseous medium causing dissociated gas precursors to deposit a series of patterned layers corresponding to the plurality of holograms. [Emphasis added] The joined series of patterned layers form a three dimensional structure.

Deutsch does teach a method of depositing a single (two dimensional) layer of a surface compatible material. (Column 3, line 9) [Emphasis added] Deutsch further teaches that a laser may be scanned across the surface of the substrate for depositing the layer in a predetermined pattern. (Column 3, lines 46-48). Deutsch teaches that this layer may be deposited on a substrate body. Deutsch further teaches that this laser may be directed to provide a holographic pattern proximate to the substrate for the deposition of a single (two dimensional) layer.

Thus, Deutsch teaches the formation of a single (two dimensional) layer of material. As mention above, Deutsch does not teach or suggest the formation of a three dimensional patterned object from a series of layers. As such Deutsch teaches deposition of a single (two dimensional) layer using a laser or potentially a hologram on a substrate. However, this does not anticipate or suggest a method of forming a multi-layered three-dimensional structure as is claimed in the present invention. .

B. Claim 7 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Marcus (U.S. Patent No. 5,017,317).

Deutsche does not teach or suggest an apparatus to deposit a three dimensional structure. The three dimensional structure comprises a series of joined layers. In particular Deutsche does not teach a holographic projector that may project a series of holograms, a gaseous delivery system applicable to provide gas precursors to a processing chamber (the holograms are projected and imaged within the processing chamber wherein the holographic image imparts energy to

dissociate the gas precursors. The dissociated gas precursors are deposited according to the pattern of the hologram. A series of depositions occur to form a three dimensional structure from a series of individual layers. Deutsche at no point teaches the three dimensional structure may be developed from a series of individual layers deposited within a processing chamber.

The applicant respectfully submits that Deutsche which is a deposition of a single (two dimensional) individual layer made of a single solid material or a single individual layer made of two or more materials simultaneously deposited to form a single (two dimensional) layer. Deutsche provides for "depositing a single solid material upon the surface of a substrate, two (or more) materials can be simultaneously deposited to form for example a compound semi-conductor, an insulator, or a conductor." (Column 10, Line 63-66). At no point does Deutsche teach that a subsequent layer of material can be deposited on a prior layer. Rather Deutsche merely teaches the deposition of a layer onto a selected surface.

The present invention differs in that the focused plane of the projected hologram neither moves as the height of materials forming the deposited layer changes or the adjusted height of the subsequent layers to be formed.

Deutsch teaches the formation of a single (two dimensional) layer of material. As mention above, Deutsch does not teach or suggest the formation of a three dimensional patterned object from a series of layers. Thus, combining the further teachings of Deutsch et al. with Marcus does not render the present claims obvious.

C. Claims 9,12 and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Maxwell et al (U.S. Patent No. 5,786,023).

For the reasons discussed above, Deutsch et al does not anticipate claim 9. Claim 12 is dependent upon claim 1 and claims 18-24 are dependent upon claims 9. Thus, combining the further teachings of Deutsch et al. with Maxwell does not render the present claims obvious.

D. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Marcus (U.S. Patent No. 5,017,317) and further in view of Amako et al (U.S. Patent No. 5,497,254).

Applicant submits that Deutsch, Amako or Marcus in combination fail to teach or suggest make obvious the invention recited in Claim 8 because the cited references do not disclose a holographic deposition system that uses gaseous precursors.

The applicant respectfully submits that Amako relates only to stereo lithography techniques that crosslink optical resins using a scanned laser. Therefore, the applicant respectfully submits that it is improper and no motivation exists to apply the teachings of Amako to the patterned deposition of any material using the dissociation of gaseous precursors. Amako merely relates to a system and method that employs a scanned laser to crosslink polymers or other like resins and does not anticipate the dissociation of gas precursors using holograms.

The applicant respectfully submits that Marcus teaches that a laser may be "scanned over a target area ... to deposit materials." (Marcus, abstract) Markus merely teaches that a scanned laser may cause preferential photodecomposition to selectively deposit materials. Thus, it is improper to apply Marcus when the present invention claims the use of a holographic image to pattern the deposition of a layer as a single step using gaseous precursors. This differs significantly from the claimed invention. Further, there is no motivation to combine these references.
Therefore the applicant respectfully submits that no motivation exists to apply the teachings of Amako to the teachings of Marcus. Furthermore, when combined these two references still fail to teach the claimed invention of the present invention.

For the reasons discussed above, Deutsch et al does not anticipate claim 7. Claim 8 is dependent upon claim 7. Thus, combining the further teachings of Deutsch et al. with Amako et al and Marcus does not render the present claims obvious.

E. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Amako et al (U.S. Patent No. 5,497,254).

Applicant submits that Deutsch or Amako in combination fail to teach or suggest make obvious the invention recited in Claim 17 because the cited references do not disclose a holographic deposition system that uses gaseous precursors.

The applicant respectfully submits that Amako relates only to stereo lithography techniques that crosslink optical resins using a scanned laser. Therefore, the applicant respectfully submits that it is improper and no motivation exists to apply the teachings of Amako to the patterned

deposition of any material using the dissociation of gaseous precursors. Amako merely relates to a system and method that employs a scanned laser to crosslink polymers or other like resins and does not anticipate the dissociation of gas precursors using holograms.

For the reasons discussed above, Deutsch et al does not anticipate claim 1. Claim 17 is dependent upon claim 1. Thus, combining the further teachings of Deutsch et al. with Amako et al and Marcus does not render the present claims obvious.

F. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutsch et al (U.S. Patent No. 4,340,617) in view of Maxwell et al (U.S. Patent No. 5,786,023) and further in view of Amako et al (U.S. Patent No. 5,497,254).

Applicant submits that Deutsch, Maxwell or Amako in combination fail to teach or suggest make obvious the invention recited in Claim 8 because the cited references do not disclose a holographic deposition system that uses gaseous precursors.

The applicant respectfully submits that Amako relates only to stereo lithography techniques that crosslink optical resins using a scanned laser. Therefore, the applicant respectfully submits that it is improper and no motivation exists to apply the teachings of Amako to the patterned deposition of any material using the dissociation of gaseous precursors. Amako merely relates to a system and method that employs a scanned laser to crosslink polymers or other like resins and does not anticipate the dissociation of gas precursors using holograms.

The applicant respectfully submits that Marcus teaches that a laser may be "scanned over a target area ... to deposit materials." (Marcus, abstract) Markus merely teaches that a scanned laser may cause preferential photodecomposition to selectively deposit materials. Thus, it is improper to apply Marcus when the present invention claims the use of a holographic image to pattern the deposition of a layer as a single step using gaseous precursors. This differs significantly from the claimed invention. Further, there is no motivation to combine these references.
Therefore the applicant respectfully submits that no motivation exists to apply the teachings of Amako to the teachings of Marcus. Furthermore, when combined these two references still fail to teach the claimed invention of the present invention.

For the reasons discussed above, Deutsch et al does not anticipate claim 7. Claim 8 is dependent upon claim 7. Thus, combining the further teachings of Deutsch et al. with Maxwell or Amako et al and Marcus does not render the present claims obvious.

Attorney Docket No.: LM P061US 11/010,506

The Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No.50-2126 of Garlick, Harrison and Markison.

Respectfully submitted,

By:_____

Robert A. McLauchlan
Reg. No. 44,924
ATTORNEY FOR APPLICANT

Dated: May 17, 2007

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Claim Appendix:

1. (Currently Amended) An apparatus for forming a three-dimensional structure from a gaseous medium, comprising:

a processing chamber to contain the gaseous medium; and

a holographic projector to project a plurality of ~~t least one~~ holograms into the gaseous medium within the processing chamber, wherein the plurality of holograms imparts energy to dissociate gas precursors within the gaseous medium causing dissociated gas precursors to deposit a series of ~~in a~~ patterned layers corresponding to the plurality of ~~t least one~~ holograms;

wherein the three-dimensional structure comprises the series of patterned layers.

2. Canceled.

3. (Previously Amended) The apparatus of Claim 1 wherein the gas precursors within the medium are gaseous organometallic compounds.

4. Canceled.

5. Canceled.

6. Canceled.

7. An apparatus to deposit a three-dimensional structure comprising:

a holographic projector to project a series of holograms;

a gaseous delivery system to deliver gas precursors; and

a processing chamber, wherein the processing chamber further comprises:

a window, wherein the window is transparent to the holograms;

a plane on which the holograms are imaged;

an inlet to receive the gas precursors from the gaseous delivery system, wherein the hologram imparts energy to dissociate the gas precursors causing dissociated gas precursors to deposit in the plane in a pattern corresponding to the hologram; and

an outlet to exhaust effluent from the processing chamber.

8. The apparatus of Claim 7, wherein the holographic projector further comprises:

a laser light source to generate coherent collimated electromagnetic energy;

a computer driven phase plate placed in a path of the coherent collimated electromagnetic energy to the hologram.

9. (Previously Amended) A method for forming a three-dimensional solid structure, the method comprising:

establishing a process environment having a controllable pressure, temperature and atmospheric composition, wherein the atmospheric composition comprises gas precursors; and

imaging a first hologram within the process environment, wherein the hologram impart energy to the gas precursors, causing the gas precursors to dissociate, wherein dissociated solids from the gas precursors form a first solid layer corresponding to the hologram; and

imaging a subsequent hologram within the process environment, wherein the subsequent hologram energy to the gas precursors, causing the gas precursors to dissociate, wherein dissociated solids from the gas precursors form a subsequent solid layer corresponding to the subsequent hologram, wherein the subsequent solid layer is joined to the first solid layer.

10. (Previously Presented) The apparatus of Claim 1, wherein the energy to dissociate gas precursors corresponds to a wavelength of electromagnetic energy used to project the at least one hologram.

11. (Previously Presented) The apparatus of Claim 1, wherein the energy to dissociate gas precursors corresponds to absorption bands of the gas precursors.

12. (Previously Presented) The apparatus of Claim 1, wherein a pressure and temperature of the gaseous medium within the processing chamber are manipulated to manipulate a deposition rate of the dissociated gas precursors.

13. (Previously Presented) The apparatus of Claim 1, wherein an intensity of the at least one hologram is manipulated to manipulate a deposition rate of the dissociated gas precursors.

14. (Previously Presented) The apparatus of Claim 3 wherein the gaseous organometallic compounds allow metal to be deposited in the pattern corresponding to the at least one hologram.

15. (Previously Presented) The apparatus of Claim 1, wherein the at least one hologram is projected onto a stage within the processing chamber.

16. (Previously Presented) The apparatus of Claim 15, wherein the stage is thermally biased.

17. (Previously Presented) The apparatus of Claim 1, wherein the holographic projector further comprises a computer driven phase plate illuminated by a laser source to generate the at least one hologram.

18. (Previously Presented) The method of Claim 9, wherein the energy to dissociate gas precursors corresponds to a wavelength of electromagnetic energy used to project the first hologram and subsequent hologram.

19. (Previously Presented) The method of Claim 9, wherein the energy to dissociate gas precursors corresponds to absorption bands of the gas precursors.

20. (Previously Presented) The method of Claim 9, wherein a pressure and temperature of the gaseous medium within the processing chamber are manipulated to manipulate a deposition rate of the dissociated solids.

21. (Previously Presented) The method of Claim 9, wherein an intensity of the first hologram and subsequent hologram is manipulated to manipulate a deposition rate of the dissociated solids.

22. (Previously Presented) The apparatus of Claim 9 wherein the gas precursors are gaseous organometallic compounds that allow metal to be deposited as the dissociated solids.

23. (Previously Presented) The method of Claim 9, wherein the first hologram and subsequent hologram are projected onto a stage within the processing environment.

24. (Previously Presented) The method of Claim 23, wherein the stage is thermally biased.

25. (Previously Presented) The method of Claim 9, wherein a holographic projector comprising a computer driven phase plate illuminated by a laser source is used to generate the first hologram and subsequent hologram.

Evidence Appendix

No additional evidence is being submitted with this brief.

Related Proceedings Appendix

There are no other proceedings regarding the present patent application.